HIRLAM Management Group (HMG) – ALADIN Committee for Scientific and System/Maintenance Issues (CSSI) Meeting

Oslo (Norway), CIENS Building, 22nd and 26th April 2007

Minutes edited by Martin Janousek

Participants:
HIRLAM: Jeanette Onvlee, Nils Gustafsson, Mariano Hortal, Trond Iversen, Xiaohua Yang, Sander Tijm (joining on 23rd April)
ALADIN: Jean-Francois Geleyn, Pierre Benard, Bart Catry, Ryad El Khatib, Claude Fischer, Andras Horanyi, Martin Janousek, Jure Jerman, Diana Klaric, Jean-Antoinne Maziejewski, Patricia Pottier, Piet Termonia, Martina Tudor

1. Introduction

The first part of the meeting took place on Sunday, 22nd April 2007.
Participants introduced themselves tour-de-table. It was agreed the morning session was going to be chaired by J.-F. Geleyn and the afternoon session by J. Onvlee.

2. Review of actions agreed on in the Sofia HMG-CSSI meeting

The Sofia meeting agenda scan was performed and items reviewed.
Add item 3 (Particular ongoing actions), subitem a (Data assimilation):
The observation operator inter-comparison is going on with some involvement of ECMWF. ALADIN tangent linear and adjoint (TL/AD) development is well advanced, TL is already validated in the reference library and AD will probably enter an interim cycle in the summer 2007. There is some progress in 4DVAR physics development, mainly in relation with the radar observation assimilation which is developed along the AROME path. Some work was done in the satellite observation assimilation but not in the anticipated scope and range.
3DVAR/ODB training took place in Budapest and experimentation started.
SURFEX workshop was organized in Toulouse but currently there is little progress in the subject due to missing momentum and manpower.
EURRA did not receive a clear demand from EEA and therefore no resources are put at the project as such. However some related topics will be worked on but under different frame (DEMOCLES).
Add item 3 (Particular ongoing actions), subitem b (Predictability):
A working week in Sweden was held to develop HIRLAM/EPS visualization and verification tool. The tool was then validated by applying on Hungarian data. A. Horanyi stated no clear distinction from ALADIN verification project. X. Yang replied EPS verification was different from deterministic model verification. A. Horanyi maintained the need of avoiding two independent packages development. Finally it was agreed to wait for the Workshop outcome in this regard.

Preparation of GLAMEPS is well advancing in spite of missing financial support from EUMETNET. A. Horanyi however stated the progress and involvement of ALADIN was not fully satisfactory.

Add item 3 (Particular ongoing actions), subitem c (System):

In ARPEGE/ALADIN phasing, so many things were done that there is a certain lack of perspective in the subject.

A basic document on the operational coordination in ALADIN Consortium was prepared and updated.

R. El Khatib and X. Yang prepared an analysis of file formats used in ALADIN and HIRLAM and submitted it to HMG-CSSI.

The code validation and verification tools development is stalled. There are issues in exporting tools like 1D model outside NMSs because the packages contain copyrighted code of ECMWF. This problem concerns collaboration with academia. It is generally difficult to extract only useful part of the IFS/ARPEGE/ALADIN/AROME code due to its complexity.

Add item 3 (Particular ongoing actions), subitem d ("Political" issues):

General satisfaction was expressed with the past coordinated approach and the current state of the "NWP vision" issue.

Add item 4 (2006 workplan: common issues):

Vertical finite element got some priority but not as anticipated. There was no work done in the mid-term perspectives issue.

Add item 5 (Scientific planning):

New input is expected from the Workshop.

Add item 7:

As requested the access to restricted part of the HIRLAM web site was granted to all ALADIN Partners from their domains.

A. Horanyi proposed to asses the level of HIRLAM and ALADIN convergence at the end of Workshop.

It was decided the HMG-CSSI meeting Minutes be presented to ALADIN PAC but not to GA.

3. Status of ongoing activities

a. Data assimilation

i. Common plans for mesoscale data assimilation

N. Gustafsson presented the plan overview. There is generally a good agreement in upper-air part whilst the surface being more difficult. A clear need for a 4-year plan was identified. No clear improvement in 10 km scale was achieved yet. There is an important problem of dynamics/physics balances in data assimilation (DA). A need of introduction of moist variables ensemble was detected. A think-tank group will be organized this year to address the issue.

Concerning surface DA two meetings took place (a general DA meeting in Zurich and the Toulouse SURFEX workshop). The work is shared: ALADIN is more involved in the algorithmic and soil/urban parts (simplified 2DVAR scheme by J.-F. Mahfouf) whilst HIRLAM in the initialization (analysis), and snow/sea/ice aspects.

A discussion was carried on the trade-off between convergence and scientific development. It was proposed that each work package identify yearly its main goal and a backup goal and that the convergence will be assessed on the basis of those goals.

N. Gustafsson stated clearly the ALADIN extension zone issue as crucial for the general success of the data assimilation over large areas. Two possible solutions were mentioned: the large E-zone (the rationalization of grid-point calculations in E-zone necessary) or (in a longer term) the wavelet technique. The issue will have to receive more attention from ALADIN side.

As a short-range remedy the extended extension zone solution will be explored. R. El Khatib with the cooperation with C. Fischer and N. Gustafsson will write the analysis of the optimization of the extension zone grid-point calculations, September 2007 being the expected deadline. In parallel G.Boloni and V. Guidard will summarize work and results done so far in the data-assimilation extension zone topic.
In the long term the currently only known solution is based on the wavelet approach. It should be harmonized also with the coupling development.

ii. Code convergence, observation operators

C. Fischer introduced table overview of observation operators inter-comparison between IFS/ARPEGE/ALADIN/AROME and HIRLAM. Not all work was done; some reports are missing, more from ALADIN side. There was a difficulty to force people to complete their tests and to deliver report. The 2007 autumn is however the deadline for all reports to be delivered. All reports should not only state abut also present common recommendations (like in the GPS case).

iii. Status of common work on assimilation algorithms and use of observations

A common work has begun on wavelets starting off the ALADIN code. The 4DVAR in a nutshell is other common work topic scheduled for the end of 2007. Cooperation in the water vapour control variable development has started as well.

iv. Surface data assimilation and modelling: convergence and plans resulting from Toulouse workshop and present status

The overview of the surface DA including the comparison of methods in ALADIN and HIRLAM was presented by P. Termonia. It is recognized that the used techniques were rather engineered and of ad-hoc nature and therefore the convergence is going to be rather a challenge. A discussion was carried on how to find solutions to problems transversal to both atmospheric and surface parts in charge of different groups.
Finally a clear need of a document giving a long-term development guidance without regard to short-term development constraints was identified. It was therefore decided to broaden the scope of WG1 to prepare such a *scientific* document in a one year time. The document will be then submitted to HMG/PAC/AROME and after getting approved it shall serve as a basis for decision making and project management.

The tasks of WG1 and 2 will be redistributed. It was proposed that N. Gustafsson and J.-F. Mahfouf would join WG3.
The main action for the modified WG1 is to write the scientific paper in a 1-year time scale as a guideline for surface development in following years. A first inventory of issues is supposed to be delivered in mid June 2007.

v. EURRA

On the absence of user demands (no EEA funding) it was agreed to stop work on the project as such. Some activities which were planned for EURRA will start and/or continue in other framework (like DEMOCLES project) or as a natural part of HIRLAM and ALADIN plan.

D. Klaric stressed the importance of the high-resolution precipitation analysis for mesoscale models verifications. J. Onvlee and J.-F. Geleyn replied that the topic was still on board, it was going be worked on but not harmonized in the EURRA-way.

b. Model physics and dynamics

i. Coherent in-depth validation of mesoscale physics parameterizations and packages: how to organize?

J. Onvlee presented a plan for validation of the different mesoscale physics packages. The aim of testing is to better understand strong and weak points of each different package to identify priority areas for improvement. The detailed definition of packages, from simplest to the most sophisticated ones still needs to be done, as well as the testing periods defined. It is suggested to use SOP and/or extended observation sites data for testing.
The discussion was carried on the evaluation of test results. It was pointed out that clear procedures of evaluation of results would have to be defined before the tests start. It was proposed to make two kinds of test for each package: one in a configuration (resolution, domain etc.) common for all packages and one in a configuration most natural for each individual package. It was agreed that the inter-comparison was not going to be a competition (a "beauty contest") but a tool to help finding weak features of each package.
Three steps are proposed: a small team will set up the project before summer 2007; tests will be run by small teams in late autumn; and finally the results will be evaluated and interpreted by a larger community (summary of outcome and follow-up actions to be defined in a workshop in the beginning of 2008).

As the first step the experiments of HIRLAM, ALARO-0, ALADIN+EDMF/AROME will be set up on ALADIN side till mid-summer and on HIRLAM side till September. The working groups will have to involve AROME people, hence F. Bouttier, S. Malardel and Y. Seity will be invited as well as R. Brozkova and F. Vana, and S. Tijm, B.H. Sass and L. Rontu. The task will be to set up the experiments, list questions to be addressed and prepare experimental protocols. Later in autumn the teams will be enlarged and all decisions revisited, in particular the surface set-up.

ii. Validation and verification working group

J. Onvlee informed that although the working group has been gathering information on interesting typical test cases, their activities lately have been minimal. No systematic validation has started yet. Communication on near-real-time monitoring should be improved via regular reporting and/or mailing list.

WG should be revitalized by presenting more validation cases.
It was decided to introduce INCA analysis into the system and to invite M. Jerczynski to get familiar with the INCA-based verification and to possibly install data of more periods.

iii. Status of dynamics developments

M. Hortal pointed out that due to close interrelation of dynamics with each system different issues are stressed in HIRLAM and ALADIN. Due to large integration domains used by HIRLAM the map factor cannot be kept constant in the semi-implicit scheme and therefore a study of map factor fitting by Fourier series is carried on. Vertical finite element (VFE) scheme development is given an effort in both communities but with different emphasis. J.-F. Geleyn added that more effort should also be given to the compatibility of VFE with iterative solvers.

The ECMWF statement (in their four-year plan) on the alleged instability of the current ALADIN non-hydrostatic scheme was criticized in the ensuing discussion. The reported instability was actually the result of wrong setup of tests done by the Centre. Information exchange should be therefore improved; the NH Newsletter being an important mean.
Given different emphasis of both ALADIN and HIRLAM dynamics groups they are urged to exchange their plans and check for incompatibilities.
J. Onvlee informed that HIRLAM dynamics activities at DMI have decreased to zero level due to departure of staff, but that a stronger effort can now be expected from INM.
M. Hortal reported problems linked to orography in high-gradient areas and the attempts to study impact of orographical smoothing. It was proposed that he should check if his problems could be linked to the fact that HIRLAM does not use the 923 configuration yet.
P. Termonia reported his ideas on improvements of digital filter initialization (DFI), but up to now he could not find anybody to discuss with. Both consortia lack currently available competent experts.
P. Termonia further reported on progress in the coupling development. A study of application of A. McDonald's ideas in a spectral model has started and brought some first promising results but it seems to be a real long-term research before coming to a practically useful scheme.

A. McDonald and P. Termonia will start their discussions on LBC. Concerning DFI it was proposed that P. Termonia would summarize his proposals and contact P. Lynch to check if there is a potential student to take care of the subject. M. Hortal will be kept informed.

c. Predictability

T. Iversen presented GLAMEPS project status. ECMWF now serves as the GLAMEPS Data Centre where a laboratory version of the system is built under an ECMWF Special Project. First tests have been run, still in rather limited scope due to limited amount of billing units allocated for the project this year. Parameters of the laboratory system are still discussed; the selections of integration and post-processing domains are the most difficult issues. The presentation package is also under development accompanied with some implementation problems.
In general, the project is going on well despite of the failure to obtain the FP7/EUMETNET funding.
A. Horanyi pointed out ALADIN community was reluctant to use GLAMEPS system at ECMWF due to the limited access to and little experience with ECMWF HPC system. He mentioned some members could be run in ALADIN countries if the computing cost of the domain permits. He also offered some experience with downscaling and clustering in the ALADIN community which can be utilized in GLAMEPS, as well as the verification package.
T. Iversen replied that the distributed operations were complicated step and they were not going to be aimed at in 2007.
In the following discussion it was recommended to focus on the finalization of the laboratory system set up and the start of experimentation. An increase of involvement of ALADIN community was identified as a critical issue and the issue was going to be pushed to the CSSI and LTM meeting during the Workshop. It was proposed that ALADIN pools its resources from the Partners which are Members of ECMWF.
D. Klaric asked about an involvement in TIGGE-LAM project. T. Iversen replied that the main obstacle was currently in the technical requirement of TIGGE to use GRIB-2 format. The issue was going to be addressed by the Interoperability project.

Due to the lack of time it was decided to use for GLAMEPS the presentation system developed by NMI based on Metview. LACE will finance a week for E. Hagel to get familiar with the Spanish system.
Every ALADIN Partner can access the presentation system at ECMWF via the Special Project. In order to start the laboratory system of GLAMEPS in September all actions from ALADIN side will have to be taken by June. J.-F. Geleyn and A. Horanyi will be the persons from ALADIN side in charge of ensuring application of these orientations.

d. System aspects

i. Phasing: process and procedures

C. Fischer reported on the common phasing actions. More and more HIRLAM visitors have been coming to Toulouse for short visits both for HIRLAM-born code porting and regular phasing. In future more system experts should be involved and the proportion of remote phasing actions will increase, including using videoconferencing to organize experts meetings. X. Yang mentioned personal problems of HIRLAM people with families to come to Toulouse for longer stays.
Various options for new source-code management system are currently considered. X. Yang expressed interest of HIRLAM to access ALADIN code via Perforce system at ECMWF. J.-F. Geleyn recalled the very basic rule: every LAM-related ALADIN-HIRLAM development must enter reference code exclusively via Météo-France ClearCase (or it successor). This rule is a consequence of the fact that the software agreement was signed between ECMWF and Météo-France (and not with ALADIN Partners who have sometimes limited access to ECMWF). The rule was accepted by HIRLAM when searching code collaboration. J.-F. Geleyn urged keeping this rule in front of a very sensitive political issue. X. Yang replied the work via Perforce was not the current practice but a potential way for HIRLAM to access also other ALADIN code cycle than the export versions only. J. Onvlee concurred with J.-F. Geleyn not to confuse priorities. If some evolution is needed it should first go through a renegotiation of the software agreement.
A. Horanyi asked if the videoconferencing and other decentralization procedures as well as the HIRLAM-specific rules for phasing stays duration would apply to ALADIN Partners as well. C. Fischer answered that decentralization was going to be applied for ALADIN as well but the rules for ALADIN visitors in Toulouse would remain practically unchanged.
A. Horanyi asked for more information on the validations done by HIRLAM at ECMWF. X. Yang expressed the wish the declared cycle code be validated also on HPC system at ECMWF (HPCE). C. Fischer replied it had to be answered by Météo-France but in general it could be requested for common reference code versions only and not for every cycle. X. Yang stated such validation important because HARMONIE package had to be generated such that it was proven to run on HPCE.
A better description on how to install ALADIN on different platforms was also requested. In fact the effort to make such documentation had started in past in ALADIN several times.

ii. Output formats

R. El Khatib introduced the document on the existing file formats used in HIRLAM and ALADIN. Although all current formats are in principle just different wrappers around GRIB format it is not likely the internal file formats will unify in a near future. Two possible solutions for handling different external formats based on either application interfaces or convertors will coexist and combine. The subject will be of a primary focus of the SRNWP

Interoperability Project where an option to converge to GRIB-2 using ECMWF's GribAPI should be pushed.

In order to find appropriate candidates for responsible NMS Director and the Project Technical Manager of SRNWP/Interoperability Project it was decided to ask HAC and PAC to explore possible candidates (before September).

iii. Compilation and version control

The discussion focused more on the job maintenance and submission systems. Many systems exist and their documentation is needed.
M. Hortal encouraged using PrepIFS more widely as this had become a more flexible tool even though it still needed an adaptation for various LAM applications. Some HIRLAM countries have decided to explore PrepIFS and will share their experience with others. The aim is to evaluate if PrepIFS can simplify the usage of our systems and not to complicate it which could be e.g. detrimental to the collaboration with the academia.
In order to promote HIRLAM/ALADIN/AROME models as a community models for academia it is necessary to analyze and define their needs. Then an appropriate part of the model can be extracted, frozen, customized and committed to be maintained in a usual 5-years cycle.

It was decided to set up a working group which will analyse needs of academic users of NWP models and draft a plan (P. Termonia, B. Catry, M. Tudor, a representative of Météo-France (name to be provided by Claude Fischer), T. Iversen, S. Tijm, all to be still confirmed).

Recapitulated list of actions and the people responsible for them:

- Ryad el-Katib: explore extended extension zone solution and write analysis of the optimization of the extension zone grid-point calculations, in cooperation with Claude Fischer and Nils Gustafsson. Deadline: September 2007.
- Boloni, Guidard: summarize work done so far on the extension zone topic
- Nils Gustafsson, Jean-Francois Mahfouf: arrange visit of Maria Diez, Han The to Toulouse, to work on proposed setup for suface soil data assimilation.
- Claude Fischer, Nils Gustafsson: arrange completion of observation operator descriptions and report on recommendations for convergence. Common document ready in September.
- Surface WG1 members: write guideline scientific paper for surface development within 1 year. Initiator of WG1 activities: Jean-Francois Geleyn. First inventory of issues to be delivered mid-June 2007.
- Jeanette Onvlee, Radmila Brozkova: initiate working group on physics validation and intercomparison, to plan these experiments in detail. Jeanette will get in touch with AROME management on their participation. Plans to be ready by September 2007.
- Sander Tijm: consider how to provide feedback from HIRLAM mesoscale monitoring /verification efforts to ALADIN/AROME developers more structurally and regularly.
- Piet Termonia, Aidan McDonald: consider possibilities of treatment of transparent LBC as proposed by Termonia in more detail.
- Piet Termonia: contact Peter Lynch on his proposals for DFI treatment, also on possibility to involve students from Dublin University in this work.
- Ulf Andrae, Radmila Brozkova: work out experiments on treatment of pressure gradient force near orography.

- Jean-Francois Geleyn, Andras Horanyi: coordinate ALADIN contributions to GLAMEPS laboratory system setup. To be ready in September 2007.
- Trond Iversen: distribute setup of “Version 0” of GLAMEPS system, as agreed at the meeting.
- Jean-Francois Geleyn: promote pooling of computational resources at ECMWF in ALADIN.
- Jeanette Onvlee, Xiaohua Yang: discuss possibilities to do phasing at ECMWF in future with appropriate people at Meteo-France (to be indicated by Claude Fischer).
- HIRLAM system group together with ALADIN/AROME system experts: documentation of installation of ALADIN on different platforms from scratch.
- Xiaohua Yang, Ryad el-Khatib: push API GRIB solution for I/O formats in Interoperability proposal.
- Claude Fischer: invite Marek Jerczynski to familiarize himself with INCA and work on INCA-type verification.
- Jeanette Onvlee: request HAC for suggestions for responsible members/programme management of SRNWP follow-up proposals; Jean-Francois: the same for PAC. Jeanette Onvlee: ask Jean-Pierre Chalon about possibilities to recruit project staff from countries other than responsible member.
- Jeanette Onvlee, Jean-Francois Geleyn: take initiative to get drafting committee for model as tool for academia up and going.